been provided each Board. These Boards form the fingers, as it were, of the medical directorate. At each one of these Boards there is an ophthalmologist. Working under his supervision and for his assistance, there is a female orthoptist. The orthoptist assists with ocular muscle balance studies, diagnostic procedures, and carries out orthoptic treatment on those cases selected by the ophthalmologist. This orthoptist also takes fields of vision and assists with the history-taking, filing, and other office procedures. Where the ophthalmologist has been over-burdened with refractions, optometrists have been supplied. These latter, working with the ophthalmologist, and under his supervision, are giving most efficient service. This ophthalmic "unit" has taken over many of the consultative functions of the ophthalmologist on Medical Selection Boards, and has added thereto all the purely professional functions of specialist practice.

With the added knowledge of the last three years, it has been possible to reduce the number of Medical Selection Boards to two large ones. At each of these boards there is an ophthalmic "unit" or "cell" acting in close co-operation with the other members of the board. This consists of an experienced ophthalmologist and two or three medical officers under instruction, and three or four female ophthalmic assistants whose duty it is to carry out the night-vision program, consisting of training and selection. All the above comes under the supervision of the ophthalmologist, who in turn is responsible to the President of the Board

A word may be said here in regard to medical officers under instruction in ophthalmology. The R.C.A.F. never has had a sufficient number of experienced ophthalmologists to carry out the necessary and various activities outlined above. The supply in civilian practice is limited also. It seemed logical, therefore, to begin training our own men. At Medical Selection Boards there is an unexcelled opportunity to gain experience in physiological optics, ocular muscle balance, and refractions, which form a large part of the foundation of good ophthalmic practice. The Medical Selection Boards, therefore, form an excellent starting point in such a training program.

Also, at strategically placed hospitals, eye, ear, nose and throat specialists have been placed. Patients requiring treatment are referred into these central places for examination, diagnosis, and treatment. A Command Medical Board and its ophthalmologist is always available to supplement the opinion of this officer, as it provides facilities for examination and treatment not possessed by him. In order that these officers' specialized training may be fully available for treatment and surgery, an optometrist working under his supervision has been provided, where necessary, to relieve the burden of refractions.

SUMMARY

It has been attempted to present a picture of the development and present status of ophthalmology in the R.C.A.F., with its varied interests, responsibilities, duties and facilities. It only remains to add that every effort has been made to prevent it from becoming static and confined in a water-tight compartment. The avenues of approach to it are wide open and well travelled roads.

THE EXPECTORANT ACTION OF PAREGORIC

By Eldon M. Boyd, M.D. and Marion L. MacLachlan

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PAREGORIC, or Camphorated Tincture of Opium, B.P., U.S.P., has been used as a cough sedative for many years with very little laboratory investigation of its mode of action. Its chief constituent, tincture of opium, is well known as a cough sedative and some have claimed that the entire virtue of paregoric lies in its opium content; Goodman and Gilman,[7] for example, describe paregoric as, "a needlessly complex therapeutic survival of a former day". On the other hand, many textbooks claim a peculiar value for paregoric in the treatment of dry, hacking coughs and several clinicians, for example Professor W. T. Connell,[5] believe that there is a difference between the action of camphorated tincture of opium, or paregoric, on the one hand, and tincture of opium or laudanum, on the other, the paregoric tending to "loosen" a cough better than the laudanum.

Hence it was decided to investigate the reputed expectorant action of paregoric by measuring its effect upon the output of respiratory tract fluid (hereinafter referred to as R.T.F.)

according to the technique being used in this laboratory for the study of expectorant drugs. The results obtained substantiate the clinical impressions of over two centuries in proving that paregoric does augment the output of R.T.F. in a variety of animals, including birds and mammals, and hence may be regarded, if the data upon the experimental animals may be applied to man, as an expectorant which would soothe an irritated, dry, inflamed respiratory tract by bathing the mucosa with added secretions, and this in addition to the depressant effect of the opium upon the cough centre in the medulla oblongata.

THE HISTORY OF PAREGORIC

Modern authors[7, 10, 11] have written that paregoric originated with Dr. Le Mort, a professor of chemistry at the University of Leyden from 1702 to 1718. Under the name of "Elixir Asthmaticum" it became official in the London Pharmacopœia of 1721, the preparation containing honey, licorice, flowers of Benjamin, and opium, camphor, oil of aniseed, salt of tartar and spirit of wine. In the London Pharmacopœia of 1746, the name was changed to Elixir Paregoricum, a name which is still used as a synonym for paregoric. Later,[4] the preparation became called Tincturata Opii Camphorata in the Edinburgh, Dublin and United States Pharmacopœias and Tinctura Camphoræ Composita in the London Pharmacopœia. The British Pharmacopœia, which replaced the London, Edinburgh and Dublin Pharmacopœias, retained the name Tinctura Camphoræ Composita until the 1932 edition, when the old name of the Edinburgh Pharmacopœia was adopted in its place. While the old Scotch name was finally adopted for a preparation which has remained essentially of the same composition for over 100 years, it should not be confused with the "Scotch Paregoric" which is an ammoniated tincture of opium described in the British Pharmacopœia Codex.

The word "paregoric" comes from the Greek word "paregoricon" which was originally applied to oratory and to a particular form of oratory in which distraction of attention was the predominant feature. It then passed through various shades of meaning from "consoling" to "soothing" and finally came to have the same significance as "anodyne". The Pharmacopœia Schroedero-Hoffmannia of 1687 listed a Tinctura Anodyna containing ingredients similar to those of Le Mort's Elixir Asthmaticum, except for the absence of camphor, and it is possible that Le Mort derived his formula from this older tincture.[10] There was nothing particularly novel in Le Mort's inclusion of camphor, because camphor had been used from the time of the Arabians, half a millenium or so earlier.

In fact, how much credit should be given to Le Mort for the introduction of paregoric is open to serious question. In the first place, his formula, though similar to, differs considerably from that of the modern paregoric. In the second place, it is possible to find all of the ingredients of Le Mort's Elixir Asthmaticum referred to in a number of works published before his time and often in a similar compounding. A number of these early volumes have been referred to in an effort to give credit to whom credit is due. The idea that opium should be mixed with other drugs and not given alone can be traced back to the time of the ancient Greeks, of Galen, Paracelsus and others.[9] The Pharmacopœia of J. Sylvius, published in 1574,[14] contains no reference to any preparation resembling paregoric, but several later authors refer to these drugs in the therapy of various chest conditions. The translation and enlargement of the works of Riverius, who was described as "Councellor and Physition to the King of France", by Culpeper, Cole and Rowland in 1678[6] states that honey (oxymel) was used "to discuss the humours better", while reference is made in several prescriptions to opium, licorice, Benjamin and camphor. In the "Thesaurus et Armamentarium Medico-Chymicum" of Hadrianus à Mynficht, translated and published in 1682 by John Partridge,[1] a "Laudanum Opiatum" is described containing, amongst other things, opium and "Juyce of Liquorish", and for pleurisy there is a prescription containing opium, licorice and aniseed. Ten years later, in Dr. Willis' "London Practice of Physick"[15] prescriptions for "the Phthisick" contain "Syrup of Meconium", an obsolete crude preparation of poppy seeds, leaves and often other adulterants, together with such old animal preparations as "Water of Snails and of Earthworms".

In 1701 was published a scholarly, philosophical, though in many places a thoroughly incomprehensible book entitled "The Mysteries of Opium Revealed" by John Jones, a Welsh

physician, Chancellor of the Cathedral Church at Landaff.[9] Jones explains (*sic!*) that opium contains an inert "earthy part", a therapeutically active "Sal-Volatile-Oleosum" and a "Rosin" which is toxic, causing nausea, vomiting and even death, because it sticks to the wall of the stomach! He states that opium should not be given alone, but only after either (*a*) removing the "resinous part" by a watering-out process which he describes, or (*b*) by combining opium with other substances which "helped the dissolution and digestion of the rosin". Substances which act in the latter capacity are listed as "Spirit of Wine", "Salt of Tartar" and certain others. Jones concludes that Benjamin should not be included because of its own resinous part. If Jones' thinking is representative of that of his day, it is readily understood how combinations of opium, including Le Mort's Elixir Asthmaticum, came into being. While Le Mort was a well known man in his day and had made other preparations of opium, including a "Rainwater Extract",[9] the evidence does not seem to justify his being credited with the discovery or origination of paregoric. Rather would it be more logical to conclude that paregoric finally crystallized out of a welter of combinations of opium, dating back even to the Greeks, Romans and Arabians, but especially to medical practice of the 17th to early 19th centuries.

PAREGORIC AND THE OUTPUT OF R.T.F.

As expectorants are drugs which are reputed to affect the volume or composition of R.T.F., with heretofore so little evidence, it may be noted that the explanation is almost purely philosophical, and, as paregoric is commonly used in expectorant mixtures, the effect of paregoric upon the output of R.T.F. was determined by the method of Perry and Boyd[12] with later improvements described by Boyd, Jackson and Ronan.[2] The animals were anæsthetized with urethane, B.P. (ethyl carbamate, U.S.P.) with a dose sufficient to produce Plane I of surgical anæsthesia or slightly more so, perhaps about a 30% anæsthesia as estimated after Guedel,[8] the average dose being 1 gram per kilo body weight given intraperitoneally as a 25% aqueous solution. This degree of anæsthesia does not eliminate, or at least does not eliminate all of, the reflexes from the stomach to the glands of the respiratory tract.[3] The output of R.T.F. was expressed as ml. per kilo body weight per 24 hours, and readings were taken at intervals of 0.5 hours. At the end of 3 hours, the dose of paregoric was given by stomach tube, with water to a total volume of 5 ml. per kilo body weight and readings taken for a further period of some 4 hours.

Paregoric was given thus to a variety of animals, including hens, rabbits, cats, guinea-pigs and albino rats. The number of animals used, the dosage, and the mean hourly output of R.T.F. before and after the drug was administered have all been listed in Table I (*q.v.*).

TABLE I.

THE EFFECT OF PAREGORIC UPON THE OUTPUT OF R.T.F. IN VARIOUS ANIMALS

Species	*Cat*	*Rabbit*	*Guinea-pig*	*Rat*	*Hen*
No. of animals	*23*	*10*	*11*	*11*	*20*
Dose (Ml./Kilo.)	*0.5 to 5.0*	*3.0 to 10.0*	*0.5 to 2.0*	*0.5*	*0.1 to 10.0*
Output of R.T.F. (a) before drug.					
3rd hr before	1.2	0.7	1.9	2.7	1.6
2nd hr. before	1.9	2.4	2.0	6.0	2.1
1st hr. before	2.0	1.5	3.2	5.0	2.5
(b) after drug.					
1st hr. after	2.8	2.1	4.2	21.7	3.0
2nd hr. after	2.9	4.0	4.1	25.7	2.9
3rd hr. after	2.0	2.6	3.2	16.1	2.5
4th hr. after	1.4	1.2	4.1	24.9	2.3

In addition, control experiments were performed upon 12 cats, 10 rabbits, 10 guinea-pigs, 27 albino rats and 11 hens, each given 5 ml. of water per kilo body weight and no paregoric. In agreement with the results of other investigators in this laboratory, water alone in the dose used was found to have no significant or consistent effect upon the output of R.T.F. and hence data upon these 70 control animals have not been included in Table I.

Paregoric increased the output of R.T.F. in all of the species studied. The fact that a similar response was obtained in all species and that biologically there is less difference between man and, for example, the cat than between the cat and the hen, would indicate that most likely a similar response would be obtained in man. While the response to paregoric was qualitatively similar in all species, there were quantitative differences, as might be expected. To visualize these quantitative differences, the mean output of R.T.F. was calculated for the two-hour period immediately preceding and immediately following the administration of paregoric and these means have

been charted as block diagrams in Chart 1. It may be seen from Chart 1, that the quantitative response to paregoric was about the same in the cat, rabbit, guinea-pig and hen but was relatively much greater in the albino rat. The percentage increases in the output of R.T.F. in the two-hour period after paregoric over the two-hour period before the drug were: hens, 26%; guinea-pigs, 50%; cats, 54%; rabbits, 55% and albino rats, 331%. As this experiment demonstrated that the albino rat was more sensitive to paregoric than the other species, with respect to the indicator used, the albino rat was selected for subsequent studies.

THE INDIVIDUAL COMPONENTS OF PAREGORIC

As previously discussed, the ingredients of paregoric were assembled out of the obsolete humoral philosophy and quasi-scientific reasoning of the Renaissance. It is therefore interesting to be able to report that all of these ingredients have been found to contribute toward the expectorant action of paregoric, and, further, that an advantage is contained in the combination over the sum of the effects of the individual constituents. The survival of paregoric through the centuries, and particularly through recent critical decades is probably due to keen clinical observation and stubborn adherence to the clinical deduction that paregoric is useful in certain types of cough. Certainly, there have been no previous laboratory data which would substantiate the retention of paregoric as a pharmacopœial drug.

The components of paregoric were given to albino rats in doses corresponding to those amounts present in 0.5 ml. of camphorated tincture of opium, B.P. per kilo body weight. The doses were as follows: tincture of opium, 0.025 ml.; camphor, 1.5 mgm.; benzoic acid, 2.5 mgm.; oil of anise, 0.0015 ml. and alcohol (60%), 0.5 ml. These doses were washed down in each case with water to a total volume of 5 ml. per kilo body weight and the drugs were given by stomach tube as usual at the end of the third hour. A total of 68 albino rats were used in this experiment.

The results obtained have been summarized in Table II by comparing the mean rate of output of R.T.F. 2 hours before giving the drug in question with that for the 1st hour after giving the drug and for the entire 4 hours after giving the drug. This method of summarizing the data was selected because the components of paregoric acted, for the most part, only during 1 hour after giving the drug. All of the components increased the output of R.T.F. during this first hour after administration. To compare their relative effects, the increase in the output of R.T.F. has been expressed as a percentage of the mean output two hours previous to giving the drug. In this manner,

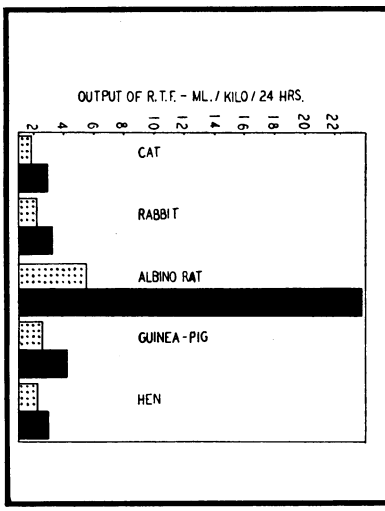

Chart 1

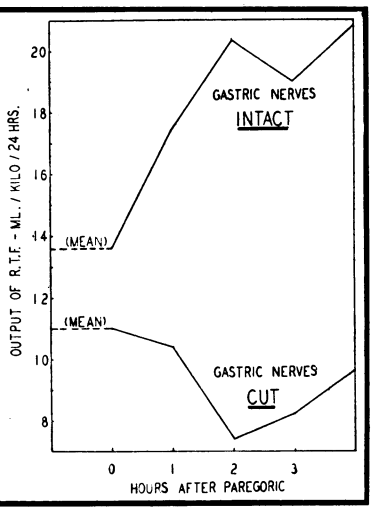

Chart 2

Chart 1.—The comparative effect of paregoric upon the output of R.T.F. in cats, rabbits, albino rats, guinea-pigs and hens. Dotted blocks: output of R.T.F. before givng paregoric; solid blocks: output of R.T.F. after giving paregoric. **Chart 2.**—The effect of paregoric upon the output of R.T.F. in albino rats given by stomach tube to animals with the gastric nerves intact and with the gastric nerves cut.

TABLE II.

THE EFFECT OF THE COMPONENTS OF PAREGORIC UPON THE RATE OF OUTPUT OF R.T.F. IN ALBINO RATS

Drug	*No. of animals*	*Mean rate for 2 hrs. before drug*	*Mean rate for 1 hr. after drug*	*% rise*	*Mean rate for 4 hrs. after drug*	*% rise*
Tincture of opium.....	17	10.6	16.7	57.5	12.2	15.1
Camphor.....	11	12.6	21.0	66.7	15.0	19.0
Benzoic acid....	13	11.4	12.9	13.2	11.1	-2.6
Oil of anise.....	10	16.2	20.8	28.4	16.6	2.5
Alcohol.....	17	10.0	18.8	88.0	15.9	59.0

it may be seen that the components may be arranged in the following order of decreasing effect: alcohol, camphor, tincture of opium, oil of anise and benzoic acid. The effect rapidly fell off after the first hour so that the mean of 4 hours after administration showed much less change from the initial rate, as may be seen in Table II.

It is of interest to compare the aggregate of the percentage increases in R.T.F. production produced by the various components of paregoric with that of the assembled components in 0.5 ml. of paregoric. The sum of the mean percentage effects of the components of paregoric one hour after administration as a 254% increase in the output of R.T.F. Paregoric itself produced a 295% increase in R.T.F. production over the same period of time, so that, when compared one hour after administration, there was little difference between the effect of paregoric and that of the sum of the effects of the components of paregoric. However, when a comparison was made between the effects averaged during the 4-hour period after administration, it was found that paregoric had a more sustained effect than the sum of its components given separately. Over this 4-hour period, paregoric produced an average output of R.T.F. of 302% above the initial value before administration, while the increase effected by the components of paregoric average only 93% during the same interval. These experiments demonstrate that there is a synergistic action between the components of paregoric whereby, when combined, they produce a more prolonged effect upon the R.T.F. output than when given separately.

While the above experiments indicate that paregoric represents an advantageous combination of ingredients, they do not necessarily prove that the sustained effect upon R.T.F. output requires all of the ingredients of paregoric nor whether the present formula for camphorated tincture of opium contains that proportion of each of the ingredients which is most beneficial in this respect. The answer to these questions, a considerable problem in itself, has not yet been investigated in this laboratory. Some preliminary experiments were performed upon the effect of different doses of tincture of opium and of alcohol. A dose of 0.5 ml. of tincture of opium was given to 7 albino rats and it had almost the same effect as the 0.025 ml. dose used above, the dose in each instance being per kilo body weight. A further 7 rats were given 0.5 ml. of 20% alcohol, in place of the 60% used above per kilo body weight, and this dose had practically no effect upon R.T.F. production. These preliminary experiments indicate that varying the percentages of some ingredients may alter the effect of paregoric upon the output of R.T.F., while varying the percentages of other ingredients will probably not affect the results.

OLD VERSUS FRESHLY PREPARED PAREGORIC

A possibility arising out of the foregoing considerations was that the components of paregoric interacted and gave rise to a product which had a more pronounced effect upon the output of R.T.F. Freshly prepared paregoric, B.P., has a pale yellow-brown colour, and, on standing, it darkens to a medium brown colour over the course of several months and finally, after several years, to a dark brown colour. These colour changes indicate that some chemical processes are taking place in the paregoric as it ages. The paregoric which had been used in the experiments described above was from a large bottle which had stood on the shelves of the drug display cabinets of this department for many years, at least five years and probably longer, and it was of a very dark brown colour.

An investigation was made of the effect of paregoric which had aged for varying periods of time and which was obtained from various sources, including the pharmacy of the Kingston General Hospital and from various pharmacies about the city of Kingston. First of all, fresh paregoric was prepared according to the formula of the British Pharmacopœia, 1932, and given in doses of 0.5 ml. per kilo to 10 albino rats. The effect upon R.T.F. production was much less striking than that seen with the old, dark brown paregoric used in the experiments described above. Five samples of paregoric were then obtained from sources outside this department and each of these given in turn to 10 albino rats in doses of 0.5 ml. per kilo body weight. The exact age of these five samples could not be accurately ascertained but four of them were of a medium brown colour, and of these at least two were known to be not over five months old. These four samples of paregoric given to albino rats produced a more or less indifferent response as did the freshly prepared paregoric. In fact, the percentage effect

upon R.T.F. production of these four samples and of the freshly prepared paregoric was actually less than the sum of the effects of the individual constituents as described above, which is rather difficult to understand. The fifth sample of paregoric was of a dark brown colour and the pharmacist from whom it was obtained was able to tell us that it had been upon his shelves for at least one year. This fifth sample produced a considerable increase in the rate of output of R.T.F., an increase almost comparable to that obtained with the old paregoric used in the earlier part of this investigation, and a sustained increase over 4 hours after administration. These experiments clearly demonstrate that during the process of becoming aged, or ripening, paregoric, like old wine, acquires properties not present in freshly prepared material, and specifically acquires the property of having an increased and increasing effect upon the output of R.T.F. How long a preparation of paregoric should age before it acquires its maximal effect upon the output of R.T.F., and what takes place in the paregoric on standing to make it more effective in this respect, have not yet been determined. Probably, it should stand for at least two or three years. Certainly, dark brown preparations are much more effective upon the output of R.T.F. than new, pale, light or medium brown preparations.

MECHANISM OF THE EXPECTORANT ACTION OF PAREGORIC

Expectorant drugs are generally held to act in one or more of three ways: (*a*) by a reflex from the stomach, (*b*) upon the expectorant centre in the medulla oblongata—and evidence is accumulating in this department that the expectorant centre is not closely linked with the vomiting centre, as is sometimes supposed,—and (*c*) directly upon the secretory cells of the respiratory tract. The afferent vagal fibres from the stomach are contained in the anterior and posterior gastric nerves which course down the wall of the œsophagus to the stomach. If no expectorant action, or, more specifically, if no effect upon the output of R.T.F., occurs after section of these nerves, it may be concluded that the drug acted by method (*a*). This was found to be the case with paregoric in the following experiments.

A laparotomy was performed upon 7 albino rats, the œsophagus completely severed just above the cardiac sphincter, and the break in the enteral canal bridged by a piece of glass tubing ligated into both ends. The abdomen was then closed, the animal arranged for collection of R.T.F. and paregoric (Sample 5) given by stomach tube in a dose of 0.5 ml. per kilo at the end of three hours. As controls, 12 other albino rats were laparotomized, the stomach and intestines disturbed to approximately the same degree as in the previous group of 7 rats, the belly wall ligated and the animals set up and given paregoric as before.

The mean hourly rates of production of R.T.F. in these two groups have been summarized and plotted in Chart 2. The albino rats with the gastric nerves intact showed the usual response to paregoric, although the rise in the output of R.T.F. was somewhat less than that previously obtained, probably because the paregoric used was not as old as that previously used and, possibly, because of the manipulation of the intestines. Paregoric given to rats with the gastric nerves severed did not augment the output of R.T.F. and as a matter of fact the output of R.T.F. fell off, as may be seen in Chart 2. These experiments demonstrate that the effect of paregoric upon the output of R.T.F. is due to a reflex from the stomach.

THE EFFECT OF MORPHINE

Attention has been drawn in recent years to a cholinergic or cholinergic-like action of morphine, particularly by Slaughter and his associates in a series of papers (for example[13]), in which it has been shown that the action of morphine upon gastric and intestinal movements, blood pressure, the pupil of the eye, cholinesterase, etc., resembles that of acetylcholine. Perry and Boyd[12] reported that pilocarpine and cervical vagus nerve stimulation augmented the output of R.T.F. Hence, even though it had been shown that paregoric acts via a gastric reflex and not directly upon the cells of the respiratory tract, it was decided to see if morphine alone had any effect upon the output of R.T.F. in a few preliminary experiments.

A dose of morphine hydrochloride of 1 mgm. per kilo body weight was injected subcutaneously into 10 albino rats; it did not affect the rate of output of R.T.F. A further 12 albino rats were given subcutaneously 0.05 mgm. of physostigmine salicylate per kilo, followed by the 1 mgm. of morphine hydrochloride; there was still no effect upon the output of R.T.F. These experiments do not demonstrate any effect of morphine upon the output of R.T.F.

SUMMARY

1. The historical background of paregoric is critically discussed.

2. Paregoric increased the output of R.T.F. (respiratory tract fluid) in albino rats, cats, rabbits, guinea-pigs and hens, and, hence, would probably have the same effect in man.

3. All of the components of paregoric individually increased the output of R.T.F.

4. When combined the ingredients of paregoric had a more prolonged effect upon the output of R.T.F. than that obtained by a summation of the effects of the individual ingredients.

5. This synergistic action of the combination of ingredients of paregoric was not seen with freshly prepared paregoric nor with paregoric which had aged less than one year. It was seen best in preparations of paregoric which had aged well over one year and which were of a dark brown colour, in contrast to the pale and light brown colour of non-aged preparations.

6. Paregoric did not augment the output of R.T.F. when the afferent vagal nerves from the stomach were severed; hence it was concluded that paregoric acted through a reflex from the stomach.

7. Morphine, either alone or following physostigmine, had no effect upon the output of R.T.F.

CONCLUSION

If the results of these experiments may be applied to man, they provide laboratory evidence justifying the centuries-old use of paregoric in the treatment of dry, hacking coughs. Because of its marked expectorant action paregoric is superior to morphine, which has probably no expectorant action, and to tincture of opium which has very little expectorant action. Paregoric is expectorant by virtue of a reflex from the stomach. Preparations of paregoric which have aged for two or three years are superior as an expectorant to preparations aged for less time.

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RÉSUMÉ

Expérimentalement, le parégorique a la propriété très nette d'augmenter les sécrétions de l'arbre bronchopulmonaire. Si ces données expérimentales s'appliquent à l'homme, le parégorique est justifiable de sa renommée thérapeutique dans les toux sèches. A cause de son action expectorante marquée, le parégorique est supérieur à la morphine qui n'a probablement pas d'effet expectorant, et à la teinture d'opium qui n'est que très peu expectorante. Le mécanisme de l'action du parégorique est un réflexe à point de départ stomacal. Les préparations qui ont 2 ou 3 années d'âge produisent des effets supérieurs à celles qui sont de date récente.

JEAN SAUCIER

CYANOSIS OF UNUSUAL ORIGIN IN PREGNANCY

(With report of a case of sulphæmoglobinæmia)

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A RECENT case of cyanosis of obscure etiology with associated dyspnœa and weakness in a pregnant woman at the Royal Victoria Montreal Maternity Hospital presented many interesting and unusual features. This is, we believe, the first reported case of sulphæmoglobinæmia in pregnancy; and is also unique in the finding of sulphæmoglobin in the cord blood.

CASE REPORT

The patient, a forty-one year old multipara, parathirteen, first presented herself at the outdoor clinic on June 23, 1943, when three months' pregnant. Her only complaint at this time was headache of moderate severity. Examination failed to reveal any apparent cause, and aspirin compound was prescribed with incomplete relief.

Four months later in the course of her routine antenatal visits she presented herself intensely cyanosed. On admission to hospital her complaints were: headache, weakness, dizziness, breathlessness, and frequent fainting spells, over a six weeks' period, with a gradual change in the colour of her skin over the same period. The history revealed the use of an aspirin compound over several months for headache. Since relief had been incomplete she had herself resorted to a proprietary preparation containing acetanilid. She had been using this consistently for two months in quantities containing an average daily dose of ½ grain of acetanilid and 2½ grains of phenacetin. Over this same period of time she had been taking 18 gr. of ferrous sulphate, every